Test Gate Station Pressure Relief Valves with Nitrogen

PRO Fact Sheet No. 609

Partner Reported Opportunities (PROs) for Reducing Methane Emissions

Applicable sector(s):

■ Production ■ Processing ■ Transmission and Distribution

Partners reporting this PRO: PECO Energy

Other related PROs: Test and Repair Pressure Safety Valves, Redesign Blowdown Systems and Alter ESD Practices

Compressors/Engines	☐
Dehydrators	☐
Pipelines	☐
Pneumatics/Controls	☐
Tanks	☐
Valves	■
Wells	☐
Other	☐

Technology/Practice Overview

Description

Pressure relief valves (PRVs) play a vital safety role by protecting gas pipelines from catastrophic rupture. They are routinely tested for the proper pressure setting by isolating them from the pipeline and activating (popping) them with natural gas pressure. Testing and adjusting the set-point pressure requires multiple tests or a continuing release of high-pressure gas. When multiplied by many PRVs, this practice can release significant amounts of methane. One partner reports eliminating the emissions by testing relief valves with pressurized nitrogen gas supplied from cylinders.

Methane Savings: 8 Mcf per year

Costs

Capital Costs (including installation)

■ <$1,000 ☐ $1,000 – $10,000 ☐ >$10,000

Operating and Maintenance Costs (annual)

☐ <$100 ■ $100-$1,000 ☐ >$1,000

Payback (Years)

☐ 0–1 ☐ 1–3 ☐ 3–10 ■ >10

Benefits

Reducing methane emissions was an associated benefit of the project.

Operating Requirements

Requires a cylinder of gas at a pressure exceeding the PRV set point.

Applicability

This practice applies to all PRVs where gas release is a safety or environmental hazard, such as in sour gas service.

Methane Emissions Reductions

The amount of methane vented in a valve test is a function of the valve size and the line pressure. A partner reported avoiding methane emissions of up to 10 Mcf per year by testing 120 pressure relief valves with nitrogen instead of methane.

Economic Analysis

Basis for Costs and Savings

The methane savings of 8 Mcf per year apply to 100 pressure relief valves a year based on partner reported surveys.

Discussion

Safety is the primary justification for testing pressure relief valves with nitrogen rather than natural gas. The economics of this PRO are based on data reported by one partner and reflect only the additional cost of nitrogen. The partner reported using 25 cylinders at 400 scf of nitrogen per cylinder. Costs exclude labor, as the company would have incurred the same labor costs to test valves with natural gas. There is no capital equipment required.